

§ 15.21

failed to detonate in the rate-of-detonation test.

(i) *New technology.* MSHA may approve an explosive that incorporates technology for which the requirements of this subpart are not applicable if MSHA determines that the explosive is as safe as those which meet the requirements of this subpart.

§ 15.21 Tolerances for ingredients.

Tolerances for each ingredient in an explosive, which are expressed as a percentage of the total explosive, shall not exceed the following:

- (a) Physical sensitizers: The tolerances established by the applicant;
- (b) Aluminum: ± 0.7 percent;
- (c) Carbonaceous materials: ± 3 percent; and
- (d) Moisture and ingredients other than specified in paragraphs (a), (b), and (c) of this section: The tolerances specified in Table II.

TABLE II—TOLERANCES FOR MOISTURE AND OTHER INGREDIENTS

Quantity of ingredients (as percent of total explosive or sheath)	Tolerance percent
0 to 5.0	1.2
5.1 to 10.0	1.5
10.1 to 20.0	1.7
20.1 to 30.0	2.0
30.1 to 40.0	2.3
40.1 to 50.0	2.5
50.1 to 55.0	2.8
55.1 to 100.0	3.0

§ 15.22 Tolerances for performance, wrapper, and specific gravity.

(a) The rate of detonation of the explosive shall be within ± 15 percent of that specified in the approval.

(b) The weight of wrapper per 100 grams of explosive shall be within ± 2 grams of that specified in the approval.

(c) The apparent specific gravity of the explosive shall be within ± 7.5 percent of that specified in the approval.

Subpart C—Requirements for Approval of Sheathed Explosive Units or Other Explosive Units Designed to be Fired Outside the Confines of a Borehole

§ 15.30 Technical requirements.

(a) *Quantity of explosive.* The sheathed explosive unit shall contain not more

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than $1\frac{1}{2}$ pounds of an approved or permissible explosive.

(b) *Chemical composition.* The chemical composition of the sheath shall be within the tolerances furnished by the applicant.

(c) *Detonator well.* The sheathed explosive unit shall have a detonator well that—

- (1) Is protected by a sealed covering;
- (2) Permits an instantaneous detonator to be inserted in the unit with the detonator completely embedded in the well;
- (3) Is provided with a means of securing the detonator in the well; and
- (4) Is clearly marked.

(d) *Drop test.* The outer covering of the sheathed explosive unit shall not tear or rupture and the internal components shall not shift position or be damaged in the drop test.

(1) The drop test is conducted on at least 10 sheathed explosive units. Each unit is dropped on its top, bottom, and edge from a height of 6 feet onto a concrete surface. For units with explosives approved with a minimum product firing temperature, the drop test is performed with the unit at the minimum product firing temperature established for the explosive in the unit. For units with explosives approved under regulations in effect prior to January 17, 1989, the drop test is performed with the unit at 41°F .

(2) At least four units which have been drop-tested shall be cut-open and examined.

(3) At least six units which have been drop-tested shall be subjected to gallery tests 9 and 10 as provided in paragraphs (e)(1) and (e)(2) of this section.

(e) *Gallery tests.* No sheathed explosive unit shall cause an ignition in gallery tests 9, 10, 11, or 12. Ten trials in each gallery test shall be conducted and each sheathed explosive unit shall propagate completely in all tests.

(1) Gallery test 9 is conducted in each trial with three sheathed explosive units placed in a row 2 feet apart. One of the trials is conducted with sheathed explosive units which have been subjected to the drop test as provided in paragraph (d)(3) of this section. The units are placed on a concrete slab, primed with test detonators and fired

in air containing 7.7 to 8.3 percent natural gas or 8.7 to 9.3 percent methane. The air temperature is between 41 and 86 °F.

(2) Gallery test 10 is conducted in each trial with three sheathed explosive units placed in a row 2 feet apart. One of the trials is conducted with sheathed explosive units which have been subjected to the drop test as provided in paragraph (d)(3) of this section. The units are placed on a concrete slab, primed with test detonators and fired in air containing 3.8 to 4.2 percent natural gas, or 4.3 to 4.7 percent methane, mixed with 0.2 ounces per cubic foot of predispersed bituminous coal dust. The air temperature is between 41 and 86 °F.

(3) Gallery test 11 is conducted in each trial with three sheathed explosive units arranged in a triangular pattern with the units in contact with each other. The units are placed in a simulated crevice formed between two square concrete slabs, each measuring 24 inches on a side and 2 inches in thickness. The crevice is formed by placing one slab on top of the other and raising the edge of the upper slab at least 4 inches. The sheathed explosive units are primed with test detonators and fired in air containing 7.7 to 8.3 percent natural gas or 8.7 to 9.3 percent methane. The air temperature is between 41 and 86 °F.

(4) Gallery test 12 is conducted in each trial with three sheathed explosive units arranged in a triangular pattern with the units in contact with each other. The units are placed in a corner formed by three square steel plates, each measuring 24 inches on a side and one inch in thickness. The sheathed explosive units are primed with test detonators and fired in air containing 7.7 to 8.3 percent natural gas or 8.7 to 9.3 percent methane. The air temperature is between 41 and 86 °F.

(f) *Detonation test.* Each of ten sheathed explosive units shall propagate completely when fired at the minimum product firing temperature for the explosive used in the unit or 41 °F for units with explosives approved under regulations in effect prior to January 17, 1989. The units are initiated with test detonators.

(g) *New technology.* MSHA may approve an explosive unit designed to be fired outside the confines of a borehole that incorporates technology for which the requirements of this subpart are not applicable if MSHA determines that such explosive unit is as safe as those which meet the requirements of this subpart.

[FR 46761, Nov. 18, 1988; 54 FR 351, Jan. 5, 1989]

§ 15.31 Tolerances for ingredients.

Tolerances established by the applicant for each ingredient in the sheath shall not exceed the tolerances specified in Table II §15.21 of this part.

§ 15.32 Tolerances for weight of explosive, sheath, wrapper, and specific gravity.

(a) The weight of the explosive, the sheath, and the outer covering shall each be within ±7.5 percent of that specified in the approval.

(b) The ratio of the weight of the sheath to that of the explosive shall be within ±7.5 percent of that specified in the approval.

(c) The specific gravity of the explosive and sheath shall be within ±7.5 percent of that specified in the approval.

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